

Amendments to the Claims:

Please cancel Claims 1 – 7, 9 – 31, and 33 – 66 without prejudice or disclaimer, and amend the claims as indicated in the following listing of claims, which replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. – 7. (Canceled).

8. (Currently Amended) ~~The~~ A microfluidic device ~~of Claim 7~~ comprising:
a body structure comprising an elastomeric polymer substrate;
a microfluidic channel disposed within said elastomeric polymer substrate;
a port on a surface of said body structure and in fluid communication with said
microfluidic channel for introducing or dispensing a fluid to or from said microfluidic channel;
a means for transporting the fluid to and from said microfluidic channel; and
at least one valve system which comprises:
a control channel disposed within said elastomeric polymer substrate; and
one or more valves operatively connected to said microfluidic channel to
regulate fluid flow through said microfluidic channel, wherein each of said valves comprises a
portion of said elastomeric polymer substrate that is located between said control channel and
said microfluidic channel, and wherein each of said valves is capable of being deflected into or
retractable from said microfluidic channel upon which said valve operates in response to an
actuation force applied to said valve, said valve when positioned in said microfluidic channel is
capable of affecting fluid flow therethrough, wherein:
said means for transporting the fluid comprises a fluid pump comprising at least
one of said valve system;
said fluid pump comprises a single control channel; and

said fluid pump control channel further comprises at least one capacitor which is capable of delaying actuation of said control channel.

9. – 31. (Canceled).

32. (Currently Amended) ~~The~~ A microfluidic device ~~of Claim 31~~ comprising:

- (a) a body structure comprising an elastomeric polymer substrate;
- (b) a microfluidic channel disposed within said elastomeric polymer substrate;
- (c) a fluid inlet in fluid communication with said microfluidic channel; and
- (d) a fluid pump for introducing or dispensing a fluid to or from said

microfluidic channel through said port, wherein said fluid pump comprises:

(i) a fluid pump control channel disposed within said elastomeric polymer substrate; and

(ii) one or more pump valves operatively connected to said microfluidic channel to regulate fluid flow through said microfluidic channel, wherein each of said pump valves comprises a portion of said elastomeric polymer substrate that is located between said fluid pump control channel and said microfluidic channel, and wherein each of said pump valves is capable of being deflected into or retractable from said microfluidic channel upon which said fluid pump valve operates in response to an actuation force applied to said fluid pump control channel, said fluid pump valve when positioned in said microfluidic channel is capable of affecting fluid flow therethrough, wherein:

said fluid pump comprises one fluid pump channel; and

said fluid pump channel comprises a plurality of capacitors which are capable of delaying actuation of said fluid pump control channel.

33. – 66. (Canceled).